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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/945,116	08/31/2001	Jiandong Shen	CISCP193/3930	2081

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EXAMINER	
SENFI, BEHROOZ M	

ART UNIT	PAPER NUMBER
2613	

DATE MAILED: 11/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/945,116	SHEN ET AL.	
	Examiner	Art Unit	
	Behrooz Senfi	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-46* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-46* is/are rejected.

7)☒ Claim(s) *25* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's argument (page 9 of remarks filed 10/7/2005) with respect to claims 1, 7, 14, 23, 34 and 40, have been fully considered but they are not persuasive. Please see response to remarks. Therefore, Claims 1, 7, 14, 23, 34 and 40 are still rejected for the same reason as set forth in previous office action, dated 8/12/2005.

2. Applicant's did not address any issues regarding claims 2, 5 – 6, 8 – 10, 12 – 13, 15 – 16, 19 - 22, 24 – 26, 28 - 33, 35 – 39, 41 – 46. Therefore, Claims 2, 5 – 6, 8 – 10, 12 – 13, 15 – 16, 19 - 22, 24 – 26, 28 - 33, 35 – 39, 41 – 46 are still rejected for the same reason as set forth in previous office action, dated 8/12/2005.

3. Applicant's arguments (page 10 of remarks filed 10/7/2005) with respect to the final rejection(s) of claim(s) 3 (similar subject matter in claims 4, 11, 17, 18 and 27) under 35 U. S. C. 102(b) have been fully considered and are persuasive. Therefore, the final rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Hartung et al (US 5,826,225) and Kikuchi et al (US 5,912,706) and Bober (US 2005/0207500).

Since the finality of the previous Office Action (dated 8/12/2005) has been withdrawn. Therefore, a new ground(s) of rejection is also made with respect to claims 1 – 46.

4. Claim 25 is still objected, as being of improper dependent form. Claim 25 should be dependent to claim 23 not to claim 24. Claim 24 does not include the steps as cited in claim 23. Please see the previous Office Action (dated 8/12/2005).

Response to remarks:

Applicant asserts (remarks page 9, lines 14 – 26, with regards to claim 1) that Kikuchi fails to teach a "residual error codebook", a "residual error vector index" or a "residual error vector".

Examiner respectfully disagrees: Kikuchi reference teaches "codebook 204" which stores code vectors with associated code book index; note that "code vector" is not a motion vector, there is a distinction between a code vector and a motion vector. In Kikuchi, the residual differences between the video signal and the prediction signal are vector values stored in the code book 204 with associated code book index, which is the residual vector index (i.e. fig. 6, col. 18, lines 4 – 5, and 14 – 25), and meets the limitations as claimed.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1 - 2, 5 – 10, 12 – 16, 19 – 20, 23 – 26, 28 – 36 and 39 - 46 are rejected under 35 U. S. C. 102(b) as being anticipated by Kikuchi et al (US 5,912,706), for the same reason as set forth in previous office action, dated 8/12/2005.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 21 – 22, 37 – 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi et al (US 5,912,706) in view of Morris et al (US 5,818,536), for the same reason as set forth in previous office action, dated 8/12/2005.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 1, 7, 14, 34, 40 and 44 – 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hartung et al (US 5,826,225) further in view of Kikuchi et al (US 5,912,706).

Regarding claim 1, Hartung '225 discloses "a system for providing video data" (i.e. fig. 1, abstract, lines 10 – 14) comprising: "a residual error codebook comprising a set of residual error vectors and a residual error vector index associated with each residual error vector" (i.e. col. 4, lines 7 – 45). Hartung '225 (col. 2, lines 34 – 38) discloses, decoder for receiving the compressed video data and regeneration of the full image. But, Hartung '225 disclosure is mostly related to video compression, and is silence in regards to details of a decoder for regeneration of video image and

predetermined motion compensation errors. However, the features as claimed are well known and used in the prior art of the record as evidenced by Kikuchi '706 (i.e. figs. 7 – 8 and 19, col. 5, lines 40 – 55, col. 7, lines 15 - 25), wherein teaches video decoding apparatus receiving the compressed video data for decoding and regeneration video signal by using the code book indexes, which is possible to effect motion compensation prediction efficiently while suppressing the amount of codes in the motion information. Taking the combined teaching of Hartung '225 and Kikuchi '706 as a whole, it would have been obvious to one skilled in the art at the time of the invention was made to use the decoding apparatus as taught by Kikuchi '706, in code book based video coding, of Hartung '225, to provide a video coding/decoding apparatus having a high coding efficiency as well as a high error resilience (col. 5, lines 12 – 14 of Kikuchi).

Regarding claims 7, 14, 23, 34, 44, 45 and 46, the limitations claimed have been analyzed and rejected with respect to claim 1. For the additional limitations "an encoder apparatus that receives uncompressed video data and outputs compressed video data, in claim 14" please see (fig. 5, encoder apparatus of Kikuchi), and "generating synthesized video data, in claims 23 and 45" please see (i.e. fig. 5, col. 40, lines 1 – 8, where teaches performing interpolation), and "converting the error vector index to an error vector, in claim 44" please see (col. 18, lines 21 – 29 of Kikuchi), and for "computer readable medium in claim 46" please see (fig. 38, computer 1001 and workstation 1005 of Kikuchi).

Regarding claim 40, the limitation "constructing a residual error codebook, the residual error codebook comprising a set of residual error vectors and a residual error

vector index associated with each residual error vector ....." have been analyzed and rejected with respect to claim 1 above. For additional limitations "generating a cluster for each residual error vector in residual error code book and receiving a set of motion compensation error block" please see (col. 44, lines 40 – col. 45, lines 13, of Kikuchi) and "assigning each of the motion compensation error to a cluster and designating ....." please see (col. 44, lines 63 – 67 classifying, of Kikuchi) and "updating" please see (col. 45, lines 12 – 13, of Kikuchi).

11. Claims 2 – 4, 10 – 11, 16 – 18 and 26 - 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hartung et al (US 5,826,225) in view of Kikuchi et al (US 5,912,706) and further in view of Bober (US 2005/0207500).

Regarding claims 2 and 10, combination of Hartung '225 and Kikuchi '706 teaches "encoder for receiving and encoding uncompressed video data and codebook comprising residual error vectors" as discussed with respect to claim 1. Combination of Hartung '225 and Kikuchi '706 references are silence in regards to "performing motion estimation on a pixel by pixel basis". However such features are well known and used in the prior art of the record as evidenced by Bober '500 (i.e. fig. 2, 210, page 2, paragraph 0029) where motion estimator module 210, uses pel-recursive techniques to perform motion estimation. Taking the combined teaching of Kikuchi '706 and Bober '500 as a whole, it would have been obvious to one skilled in the art at the time of the invention was made to improve the video coding/decoding of Hartung and Kikuchi by performing pel-recursive motion estimation as taught by Bober '500 for more accurate motion estimation, which would improve visual quality of the reconstructed image.

Regarding claims 3 and 11, combination of Hartung and Kikuchi and Bober '500 teaches "pel-recursive" for motion estimation. (page 2, paragraph 0026, lines 16 – 18 of Bober).

Regarding claim 4, combination of Hartung and Kikuchi and Bober teaches generate reconstructed video data "using MVs for each pixel in the block ....." (page 1, paragraphes 0006, 0007 and page 2, paragraphe 0026).

Regarding claims 16 – 17 and 26 - 27, the limitations claimed have been analyzed and rejected with respect to claims 2 – 3.

Regarding claim 18, combination of Hartung and Kikuchi and Bober teaches "motion vectors for each pixel in the block ....." (page 2, paragraph 0026, lines 11 – 12 of Bober).

12. Claims 5 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hartung '225 and Kikuchi '706 further in view of Bober (US 2005/0207500).

Regarding claim 5, combination of Hartung '225 and Kikuchi '706 teaches, predetermined motion compensation error (col. 48, lines 8 – 31 of Kikuchi). Combination of Hartung '225 and Kikuchi '706 references are silence in regards to "motion compensation error for each pixel in the block". However such features are well known and used in the prior art of the record as evidenced by Bober '500 (page 2, paragraph 0026) where suggest pixel by pixel/(pel-recursive) techniques, which can be used to perform motion estimation. Taking the combined teaching of Hartung '225 and Kikuchi '706 and Bober '500 as a whole, it would have been obvious to one skilled in the art at the time of the invention was made to improve the combination video coding/decoding

of Hartung '225 and Kikuchi '706 by performing pixel by pixel (pel-recursive) motion estimation as taught by Bober '500 for more accurate motion estimation, which would improve visual quality of the reconstructed image.

Regarding claim 36, the limitations claimed have been analyzed and rejected with respect to claim 5 above.

13. Claim 21 – 22, 37 – 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hartung '225 and Kikuchi '706 further in view of Morris et al (US 5,818,536).

Regarding claims 21 – 22, combination of Hartung '225 and Kikuchi '706 teaches "encoder for receiving and encoding uncompressed video data and codebook comprising residual error vectors" as discussed with respect to claim 1.

Combination of Hartung '225 and Kikuchi '706 is silence in regards to "synthesis cost/coding cost" as claimed. However the above features are well known and used in the prior art of the record as evidenced by Morris '536 (i.e. abstract, lines 12 – 15) wherein teaches the cost function to provide the best trade-off for motion vector accuracy. Therefore it would have been obvious to one skilled in the art at the time of the invention was made to use the teaching of Morris '536 and modify the combination coding system of Hartung '225 and Kikuchi '706, which would improve the video coding effectiveness.

Regarding claims 37 – 38, the limitations as claimed "wherein the codebook includes between about 256 error vectors and about 4096 error vectors" and "wherein the codebook includes between about 512 error vectors and about 2048 error vectors",

is actually the number of error vectors, which depends on desired accuracy, which is equivalent to "selecting candidate vectors with respect to accuracies" please see (col. 4, lines 20 – 25 of Morris and col. 12, lines 35 – 39 of Kikuchi).

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Behrooz Senfi** whose telephone number is **(571) 272-7339.**

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Mehrdad Dastouri** can be reached on **(571) 272-7418.**

Hand-delivered responses should be brought to Randolph Building, 401 Dulany Street, Alexandria, Va. 22314.

Any inquiry of a general nature or relative to the status of the application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is **(571) 272-6000,**

Or faxed to:

(571) 273-8300

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you

have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

B.M.S.

11/6/2005

VU LE
PRIMARY EXAMINER